

## CURRENT STATE OF WATER MANAGEMENT SYSTEM: CASE REVIEW OF BHOPAL, MADHYA PRADESH

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### ABSTRACT

*Sustainable water management is the key to achieve the objective of holistic development of all the regions of India as it constitutes one of the important ingredients in every walk of life. But due to the existence of urbanised infrastructure and numerous avenues of earning resulting in high living standards, over industrialisation coupled with higher pace of urbanisation in the cities such as Bhopal, is posing overbearing stress on existing water resources. This rapid phase of urbanisation is resulting in certain problems such as, inaccessibility of large section of the society to the clean water, rapid depletion of existing ground water resources. Steps such as finding out the leakage in water distribution network, establishment of Geographical Information System (GIS), annual water auditing, and metering recommended by bodies like UN-HABITAT are necessitated for improving the current condition of water management system in Bhopal.*

**KEY WORDS:** *Water Management, Urbanisation, Water Scarcity, Civil Society*

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### INTRODUCTION

#### Background of Research

#### Overview of Water Management System Carried Out In India and Its Condition

Sustainable use of water resources in any country is considered as one of the prerequisite conditions for overall development of the country. Since, sufficient availability of water is the need of the hour for rapid pace of industrialization and urbanization in addition to fulfilling the needs of agriculture which is medium of subsistence for large section of society in rural areas of a country like India. It is necessary for meeting all requirements of growing population of India. Therefore, managing the water in most efficient manner is desired in accordance with the current and futuristic demands related to drinking, power generation, irrigation, and domestic use. Water management practices in India are based upon the following techniques such as data monitoring, processing, storage, retrieval and dissemination (Rakesh Kumar 2005). The data generated by these techniques is used not only for managing water resources efficiently but also for designing and planning the structures of water resources. In addition to these techniques, optimum use of information technology is taking place for developing the decision support system for generating the inputs from the decision making point of view for policy makers in water resources management.

Despite making very serious efforts in this dimension, the per capita availability of water at national level has been continuously declining over the years. The quality of water is also deteriorating over the time especially in the metropolitan cities such as Delhi, Chennai, Bangalore and people belong to these cities has to rely over the distant resources that are outside the jurisdiction of local municipal bodies (EBTC 2011). Over extraction in

addition to management of existing infrastructure of water resources are one of the significant challenges before India. Water resources is also suffering from high financial distress coupled with the issues such as under financed of operation cost, inadequacy of cost recovery, lack of direct linkage between revenue and expenditure (EBTC 2011).

### **Reasons Behind the Need for Water Management System In Bhopal**

Bhopal, capital of Madhya Pradesh, is growing rapidly to enrol itself in the list of one of the largest metropolitan cities in India due to having significant improvement in urban infrastructure, level of livelihood avenues, and higher standard of living (Jotwani 2014). This growing pace of population putting stress on the existing water resources which consists of two major resources namely, Upper lake, and the Kolar reservoir. In addition to these resources, other resources such as tube wells, hand pumps, and bore wells are used to meet the daily requirements of the population. Out of the total supply, the city gets about 135 Million Litre a day (MLD) from Kolar, 99 MLD from Upper Lake, and 33 MLD from groundwater. Raw water from Kolar is pumped to a 154 MLD treatment plant by two long pipes, 36 km long (Jotwani 2014). Therefore, piped water covers almost 67% population of the city and rest of the population is entirely dependent upon the private sources supplying potable water (Jotwani 2014). Furthermore, growing pace of the population is also posing a threat on the quality of available water resources that creates the scarcity of healthy water for the people and pressurise them to receive the water of poor quality. Each year, millions of people die from diarrheal disease, and most of these deaths are the death of children under five (Jotwani 2014). Therefore, it is the need of the hour for Bhopal city to have effective water management system for fulfilling the basic needs of its population.

### **AIMS AND OBJECTIVES OF THE STUDY**

The central concern of this research work is to conduct a case study over the Current Status of the Water Management System in Bhopal on the basis of the qualitative analysis of firsthand experience that was conducted in the Bhopal for achieving the following objectives.

- To explore the current practices in the system of sustainable water management in Bhopal
- To determine the role played by civic agencies and, governmental policies and initiatives in water management and the extent of its impact.

### **RESEARCH METHODOLOGY**

To conduct research over any topic for achieving the desired aims and objectives, selection of appropriate methodology consisting of designing the research questions and hypothesis, data collection, and appropriate technique for analyzing the collected data from various resources, plays a crucial role. To achieve the objectives of this research study, qualitative analysis based upon the interviews conducted over the 10 representatives of Government's civic agency namely the Bhopal Municipal Corporation (BMC), Kolar Road Municipality, Public Health Engineering (PHE) and, Town & City Planning (T&CP) were carried out. Open-ended questionnaire was administered to the respondents selected through non-probability convenience sampling. Exploratory research has been used in analyzing the opinions given by the various stakeholders such as government officials, involved in water management system in Bhopal.

### **FINDINGS**

Interviews conducted with representatives of four government agencies associated with the water supply and management system of Bhopal presented various facts and issues related to the practice of water management, depicting

the present status of the same. Some of the excerpts, along with analysis of the views supported by secondary data have been presented below.

### **Profile of the Respondents**

Based on the first hand data collected from the ten respondents working in four different government agencies of Bhopal, a brief profile background has been created, for the ease of the readers. The respondents belong to different governmental agencies, civil society. For instances, Mr.L, Ms. T & Mr. P belong to Bhopal Metropolitan Council (BMC), Mr. B works with Kolar Road Municipality where he supervises the distribution of water network, along with Ms. K and Ms. U. Mr. Q and Mr. A work as engineers with governmental civic agencies such as Town And Country Planning Organisation (TCPO) While Mr. O entitles to look after the effective management of flood in Public & Health Engineering (PHE) along with Mr. M. Although ten respondents were selected for the interview, yet owing to limited content of the journal, only excerpts of some of the respondents have been provided below.

### **Current Status for Water Management System**

**Current Plan for Water Management System:** - Most of the officials of the Government agencies agree for having the integrated water management system. They agreed on the point that there is enough amount of water that is accumulated through various resources like lakes, yearly rainfall but it is desired to adopt certain effective techniques for its management because of certain issues such as problems in distribution network, water supply operations, to name a few. Some of the officials such as **Mr. L** explained certain techniques which are different from the traditional techniques for preserving the existing water resources such as, “*metering, establishment of Geographical Information System (GIS), water auditing and balancing.*” **Mr. B** favours the strategies such as “*dividing the whole city into different discreet units for managing the water resources effectively, and energy auditing that will reduce the amount of energy utilized thereby reducing the cost.*” He also raised the point of reducing the pollution by preventing the sewage pollution. Researchers like (Singh 2012) also echoes similar view by making this point in his research paper titled *Water Resources Management and Water Quality, Case of Bhopal*. He, through his study, recommended that desired attention should be paid upon the solid waste management within the catchment area of upper and lower lake in order to prevent the direct or indirect entry of solid wastes into lakes.

**Emergency Management Plan:** - Another officer **Mr. Q** made a valuable suggestion of “*sufficient diversion of water into irrigation channels*” for managing the emergency situations like occurrence of flood. In fact, a plan under the supervision of Ministry of Water Resources Management , National Water Resources Council, and Central Water Commission is going on for ensuring the diversion of sufficient quantity of water into irrigation canals that will not only prevent boost the agricultural production but will also assist in preventing the floods. In this dimension, other efforts are being made for finding out the flood spots by conducting the survey of all the drains in the city and their conditions (BMC 2005). **Mr. O** suggested a plan for “*transferring surplus area to deficit areas without harming the natural surroundings*”, which involves, “*development of ground water sources and surface storage*”. These initiatives will ensure regular supply to all people in addition to fulfil the requirement of agricultural activities.

**Area wise Annual Water Audit System:** - According to **Mr. B** a new initiative namely, “*area wise annual water audit system*” was started on the recommendation of report of United Nations Human Settlements Programme. UN-HABITAT in collaboration with national bodies such as, The Energy and Resources Institute(TERI) and Water Resources

Planning and Conservation and Government of Madhya Pradesh recommended in its report titled *Water Demand Management Strategies and Implementation Plan for Bhopal* that, water auditing should be regular feature and hence should be a part of the planning phase for all existing, up-coming, and up-gradation projects (UN-Habitat 2006). It has also paid attention on the obstacles such as, high cost involved for procuring water flow meters, lack of adequate manpower for carrying out such comprehensive exercise that could take place while implementing this scheme.

**Role of Civil Societies and NGOs:** - Non-governmental organisations active at national and international level are playing crucial role in maintaining and conserving the water resources. Secondary data based on reports of civil societies and published journals project the significant tasks carried out by these bodies in achieving complete success in water management system of Bhopal, thereby supporting the views expressed by the respondents. Non-Governmental Organizations (NGOs) such as *Samarthan* have been involved in maintaining the existing system of water management for demonstrating the effectiveness of community participation in maintaining the public goods for meeting their own needs (CSE n.d.). In addition to these civil societies, other actors which are directly or indirectly involved in government sponsored projects such as *Project Uday* meant for effective water management system are Pollution Control Board (PCB), Media, Mayor –in Council. The central concern of this project is to improve the capacities of the project cities for planning and managing the water supply and sanitation system in urban areas with high degree of effectiveness, and economy (Maiti 2010). Its main emphasis on improving the mapping of distribution network of water supply coupled with leak detection and waste control (Maiti 2010).

**Water Resources Management Plan of last 5 years:-** During last five years, project *Uday* is running which is a joint initiative of Asian Development Bank and UN-HABITAT. It comprises three parts namely, Urban Water Supply and Environment Improvement, Public Participation and Awareness program, and Project Implementation Assistance. But there are some issues that are creating the hindrances in implementing this project. Nearly all the respondents in their interview have unanimously mentioned that administrative hurdles in “*forming new cells, limited capacity of Municipal Corporation in implementing the comprehensive projects, lack of skilled manpower*” are the major problems in water management system in Bhopal. In addition to these problems, other issues like no network map of existing water supply lines, Project Staff Mobilisation, delay in work due to strict guidelines prescribed by the funding agencies such as Asian Development Bank in case of Project Uday also play regressive role in effective management of water system (Maiti 2010). The reasons behind the failure of existing water system, in accordance with the 60% of the respondents, are “*lack of coordination between public demand and official’s expertise, poor infrastructure*.” Most of the respondents agree upon the points such as “*strategic planning and legal framework and constructive public and private partnership*” are the practical and pragmatic solution that should keep in the mind while devising the effective policies for sustainable water management system.

## DISCUSSIONS AND CONCLUSIONS

Bhopal, capital of the Madhya Pradesh, is gradually emerging as metropolitan city in India. Due to high level of urbanisation, it faces huge problems such as rapid depletion of ground water resources, inadequacy of water resources for fulfilling the basic needs of the people of Bhopal. Although efforts are being made by Government of Madhya Pradesh in collaboration with the funding agencies like Asian Development Bank for reducing the problem of financial distress for implementing the projects such as *Project Uday* (ADB 2009), still there is a need to take other necessary steps for effective maintenance of water resources. To meet the demand of the water users, sustainable management of water resources

demands number of steps like integrated and participatory approach comprising each section of the society of Bhopal (Phadnis 2010). Active participation of farmers without gender bias in addition to creating awareness about water conservation through effective use of media is the need of the hour for maintaining high degree efficiency in the use of water. In addition to this, imparting the technical knowledge and training modules to the officials engaged in the process of sustainable water management in timely manner are the necessary steps that can be taken as effective measures for improving the water situation in Bhopal.

As far as current practices relating to water management in Bhopal are concerned, practices such as Effective Rain Water Harvesting, sufficient water supply in the agricultural lands, conservation of Upper and Lower lake are improving the conditions of public life very well as opined by most of the respondents. These measures are not only reducing the water scarcity but also improving the accessibility of city's population to healthy water in addition to making an overall impact on public health and sanitary conditions of Bhopal. In addition to these measures, advanced technologies are being used in effective management of solid waste, in management of water pollution. Although efforts are being undertaken by concerned authorities and departments but there is a long way ahead that has to be covered by constructive relationship among all stakeholders like civil societies for establishing the sustainable water management in Bhopal.

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## **APPENDIX I: Qualitative Questionnaire**

### **Section A: Current Status of Water Management System**

1. What is current plan for water management system?
2. Kindly tell about your Emergency Management Plan describing procedures for handling water emergencies?
3. Does your department follow annual water audit system area wise?
4. What role does civil societies and NGOs have played in this regard?
5. List the water resource management programs, followed in last 5 years?

Any other comments

*Thank you for your time*